NewsRelease

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Space-age Technology Peeks at American History

A team of NASA scientists working at the request of the National Archives has proved that the containers preserving several pages of the U.S. Constitution are still safely sealed.

Scientists from NASA's Langley Research Center, Hampton, VA, adapted a laser system from an atmospheric research program to peer into the encasements protecting three of the five pages of the Constitution. By analyzing how the laser was affected by water vapor within the cases, the scientists determined the two middle pages of the Constitution and the transmittal page are still protected by their half-century-old helium and water vapor atmosphere.

"This was a once-in-a-lifetime opportunity," said Dr. Joel S. Levine, the scientist who managed the project. "The U.S. Constitution is one of the most important documents in the history of the world. It was an honor and a privilege to be asked to perform this research."

In the early 1950s, the Declaration of Independence, the Constitution and the Bill of Rights, collectively known as the Charters of Freedom, were sealed in specially prepared containers. The cases were filled with humidified helium to protect the documents. When scientists beamed the laser into the cases, the water vapor inside partially absorbed the beam. By analyzing the absorption pattern, the scientists determined that the atmosphere had not changed.

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In the next few years, the National Archives will replace the containers preserving the Charters of Freedom. First, however, the agency wanted to see how the old ones held up and contacted Dr. Levine with an intriguing scientific challenge: determine the composition of the atmosphere in the containers without breaking their seals. The team used an instrument developed by Langley researcher Glen Sachse, the Diode Laser Hygrometer, to effectively take chemical samples without unsealing the encasements.

The laser system is now headed to the South Pacific aboard a NASA DC-8 aircraft to help scientists understand how human activities affect the Earth's lower atmosphere. The flight is part of the Pacific Exploratory Mission Tropics-B project, the fourth in a series of NASA airborne missions to study the atmospheric chemistry of the western and tropical Pacific Ocean regions.

NASA's research into the Earth's environment is sponsored by the Office of Earth Science enterprise, which oversees a long-term, coordinated research effort to study the effects of natural and human-induced events on the Earth's global environmental system.

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